PCW-World

PCW8256/8512 PCW9512 & PcW9256 PcW9512 + *PCW-World*

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PCW Target CP/M

Geoffrey Childs

A guide to Personal Computing with CP/M on the Amstrad PCW

Read all about our new book: 'PCW: Target CP/M'

See Page 14

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News

PCW-World Software

To help members save when purchasing their PCW Software, we are pleased to be able to offer special prices for certain 'own-brand' products.

BT Charger

This piece of useful software has proven valuable with many to help control telephone bills. We have even been asked to supply on other computer formats!

By using BT Charger to record all your telephone calls you can keep a record of the likely cost of your telephone bill, at any point in time. A printout to screen or printer gives details of the telephone number, time and cost of all calls, plus a total including VAT.

A database is also provided for you to hold details of names and telephone numbers and a very useful STD code program is included on the disk.

Special members price - £7.95 (non members price £17.95).

The World of the PCW

Book and program disk

This book and free program disk has proved popular with new and seasoned PCW useres alike.

We all know the PCW is more than a word processor. But what else can you do with your PCW - read our book and find out!

Much useful information covering almost every conceivable aspect of PCW computing can be found within the covers of 'The World of the PCW' and the program disk has a suite of useful programs. You will find an extended BASIC, a bank account reconciliation program, a menu program, Hangman, an educational alphabet game for the under fives and an animation program too. These programs could form the basis of your own programs in Mallard BASIC for those wanting to write their own software. They are however, very useable as provided.

'The World of the PCW' is available at the special discounted price of £14.95. (Non members price £17.95.)

Graphics Library

If you use Desktop Publishing software and would like a ready-made library of images to compliment your own creations, consider the PCW-World G/116 set. Over 2,000 images are stored on 16 disks (available at £2.95 per disk) in MicroDesign or Stop Press format or on G/114 in Printmaster libraries on 4 disks.

A cheap way of buying the 16 disk set is to buy G/114 (on 4 disks) and our Graphics Transfer program at £10.95 - a total of £26.75, compared with £47.20 (16 disks at £2.95 each). Graphics transfer converts between all desktop publishing software, and more. Please state disk size when ordering.

PCW Target CP/M

Another new publication by Geoffrey Childs entitled 'PCW Target CP/M' with free program disk is available now.

If CP/M (the operating system supplied with all PCWs) mystifies you, or you are interested in learning more about CP/M, our new book will be of special interest.

Two main groups of people will find 'Target CP/M' irresistible: 1. The novice user wanting to use the CP/M commands and utilities and all PcW9256/PcW9512+ owners who have very little information about CP/M with their PcW. 2. More experienced users wanting to delve further into CP/M.

See page 14 for more details.

Special Offers

Support your User Group and SAVE!

We are very pleased to announce that we are still able to offer members excellent discounts of Thurston Techniques well known (and useful) products.

The members special savings are for any TempDisc (TempDisc 1, 2, 8.2, 9 or PC) at the discount price of £9.95.

Other Thurston Techniques products that are available at special prices are as follows: WordDisc (a 39,000 word Thesaurus); Fone-Mate; XWorder; TT Patience (six card patience games) at £9.95 each. A saving of £7 for WordDisc. See elsewhere for full details. **Any one of the above is supplied FREE with orders over £50.**

Ribbon Re-inking

We can re-ink **any make of black fabric (Nylon) cassette ribbon** (not MS carbon film or colours) and offer this service to members at .99p per ribbon. Ribbon re-ink spray is also available for DIY enthusiasts at £11.95.

Maxell CF2 disks

Amsoft CF2 disks are no longer available. We now stock Maxell CF2 3" disks in cardboard sleeves at £15.95 per 10. (RRP £39)

Software

Our vast range of Public Domain (copyright free) software is now available at special prices to PCW-World members. Choose 1 to four disks at £3.95 each or 5 or more for just £2.95 each. There are some gems to be had from the library so why not take advantage of these very special prices. The price includes the disk and software, please state clearly: disk size, model of PCW and disk Refecnce. If you haven't tried any software from the library, why not try Printmaster (G/101) and Arcade Games (GA/102) and Keith Simons Collection (B/104). They are great!

Hardware

Grip Clip

A very useful copy holder that clips to either side of the PCWs monitor can be had for just £2.95. RRP is £6.95.

Bubble Jet Printer Canon BJ10EX

Special price to members for the Canon BJ10EX £230. **While stocks last!**

AMX Mouse

We have limited stocks of the very popular AMX mouse and interface (with through port) at £39.95. This includes AMX Desktop software. The AMX mouse can be used with all PCWs but a special converter is needed for the PcW9256.

3.5" Bulk Disks

Bulk 3.5" DS/DD disks (suitable for all PCW / 3.5" drives) are available for just £3.95 per ten, £19 per 50 or £35 per hundred, including labels. Stock up now at these bargain prices! Fully guaranteed.

3" Bulk CF2 disks

Bulk Maxell CF2 3" disks are available at £14.95 per 10. These disks are supplied with labels and packed individually in poly bags.

Software

SuperCalc2

This industry standard spreadsheet is available on 3" disk (not 3.5") for just £29. Special purchase means you save £££s.

PC Software (Runs on PC - *NOT PCWs*)

Amazing savings here over RRPs. LocoScript PC vn. 1.6 for only £70; AccountsMaster (needs Hard disk) £49; InfoMaster £29; dBASE III £49; SuperCalc 3.21 £49; WordStar £49; SuperCalc 4 £49. Buy any one of the above and choose another PC Software pack free. You pay for the higher priced pack only! eg. Buy LocoScript PC and choose Supercalc 4 free, you pay £70.

GDP

The General Drawing Package

Every now and again a disc arrives at PCW World with a new program, often written by one of our members. Frequently Gerry Austin passes it on to me for a second opinion. Is it marketable? Is it good public domain material?

These questions are not easy, and I suspect that often we do not always come up with the right answer. However, I believe that there are three fundamental tests for any package to pass. Does it work? Will it have value in usefulness or entertainment? Is it superior in any way to other programs in the field - if there are any?

The first test may seem trivial and obvious, but it isn't quite as simple as that. Virtually every new submission will have bugs (or perhaps semi-bugs like spelling mistakes or unclear documentation). An odd one here or there can usually be ironed out - the author of a program is often the last person to realise a bug. Sometimes the bugs occur because a program has been written for, say, the 8512 and will not work properly on other machines - a flaw which may or may not be fatal. Sometimes the author has not catered for idiot responses. In some programs these mistakes may be allowed to stand. In others they can be easily corrected. In others, they may be too frequent or complex for treatment.

But, that is enough introduction, although I hope the comments may be helpful to people who have sent or will send their contributions sent to PCW World or other organisations - and find that their brainchild doesn't quite receive the love it deserves.

It didn't take me long to realise that GDP (General Drawing Package) was something special. For a start the manual was about 60K long, and nobody writes 60K about a trivial program. The main program was about the same length - in other words, approaching the maximum size for a single program on the PCW. It also makes use of the M disc memory in an unconventional way, thus using the computer to maximum capacity. Hence it was easy to postulate that this package would do just about everything that a PCW drawing program could do. This speculation was soon confirmed when I read through the manual.

However, there is more involved in producing a program that can be used by others than to produce one that works ideally for one's own purposes. This is why I would always recommend that such a program is tested by a friend, who can be relied on to give honest opinions, before submission as a 'finished' product.

> This package can do just about everything that a PCW drawing program can do!

In the case of GDP, I found that I could use the program, but that it would need a lengthy study of the manual before I could achieve anything useful. It is three months since I first saw the program, and during these three months, both Leon Eldridge, the author, and I have been working on ways to make the package more user friendly in the initial stages. I believe that this has been achieved, mainly through the production of a second manual which will get a first time user started, and achieving results, within the first session of using the package.

GDP is a program that will produce pictures and designs. There are computer users, like myself, whose efforts to draw a picture on paper would do no credit to a six year old,

Geoffrey Childs reviews a new graphics program available from PCW-World

and yet can produce at least passable results using a computer with suitable programming tools. At one time, the PCW was definitely not considered as a graphics computer. Certainly, it was not even mooted in the initial advertising. Yet, with the rise of desktop publishing, more and more users are seeing the possibilities. Of course, the PCW cannot produce coloured screens, like some computers can, but even this can sometimes be overcome with an add on printer with colour facilities - even, by using a standard printer with coloured ribbons. If you would like to produce pictures of your own design, then GDP is an ideal way to do it!

It is suggested that you first run a demonstration of the example screens on the disc, the demo can later be used with your own screens. Then you are taken through the construction of a simple picture of a house with the sun in the background. You should be able to complete and save this screen on the next wet Sunday afternoon you have free!

Having done this, you are advised to read the full manual. I think that you should use the same approach as you probably used with Locoscript. Don't try to learn to do everything at once, but just browse through the manual to find out what can be done, and leave the study of individual techniques until you need them. The manual is quite technical in places, but you will probably not need to worry about anything that you do not immediately understand until you become quite experienced.

The facilities are many and varied, but are mainly short cuts to achieve what will be needed in your pictures. You can, of course, draw freehand plotting individual points, or moving the cursor to draw a 'snail trail' - my phrase, but you will know what I mean. However facilities are there for many routines of which a selection follows: boxes, circles, arcs, pie-charts, fills, sprays, rubber lines.... etc. There are also facilities to create user defined characters, your own character set and logo. It is also possible to import clip art. You may not need or use all of these facilities, but then you may not need or use headers and footers in Locoscript.

A question may be asked about compatibility with other drawing programs. You will have read about the GT program in other news letters. It is a happy coincidence that Leon's .SCR format is identical with my .UNS format used in GT, so the answer is certainly that GDP screens can be transferred into all the other usual formats by this means (or often directly from the program itself).

GDP is not a program you will pick up and exhaust in a couple of hours. It may even mean hard work to master the technicalities, but I hope many PCW users will find this enjoyable and rewarding.

GDP is available from PCW World. Members price £19.95. Please state disk size when ordering. Thank you.

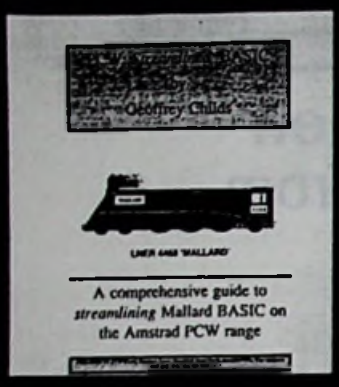
LocoScript 3

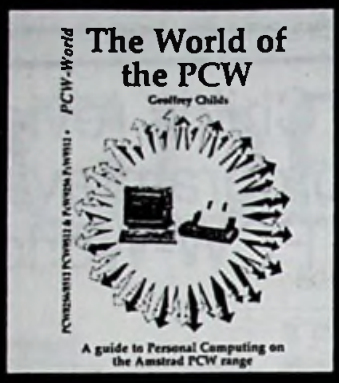
If you haven't heard, LocoScript 3 is available now, for all PCWs and LocoScript 2 has been discontinued.

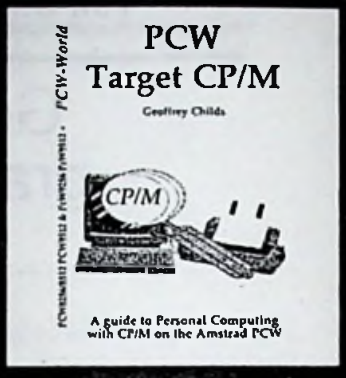
LocoScript 3 requires at least 512K memory (PCW8256 & PcW9256 users will need to upgrade the internal memory - at a cost of £14.95 from PCW-World).

LocoScript 3 allows you to produce extra large (72 point) or small (8 point) characters in the same document. LocoScript 3 is supplied with Roman and Sanserif fonts which may be mixed in the same document using different point sizes. The large fonts are ideal for professional looking letterheads or headlines. You can use the new features with the built in matrix or inkjet printer or using the new Printer Support pack with any other add-on printer.

LocoScript 3 is available as an upgrade for those with LocoScript 2 at £29 or, if you still have LocoScript 1 the full LocoScript 3 pack costs £39 (which includes all the features of LocoScript 2).







THREE VERY SPECIAL BOOKS FROM PCW-WORLD BY RENOWNED PROGRAMMER GEOFFREY CHILDS

PCW: STREAMLINED BASIC

(Book with free program disk) £17.95

Streamlined is intended for users who have already experimented with programming, but wish to use the facilities of the PCW to a greater degree. The first part of the book deals with useful programming techniques that can be used in standard Basic programs to good effect. The second part deals with topics such as graphics, sound, key setting and direct disk access - topics that are generally, but erroneously, considered beyond the scope of the PCW, certainly with Basic! There is a chapter of useful PEEKs and POKEs, of which only a few seemed to be generally known. Complete with disk of sample programs.

Buy all three and save £10!

THE WORLD OF THE PCW

(Book with free program disc) £17.95

A new book of 22 chapters with an immense wealth of information of interest to every PCW user. Topics as diverse as 'Setting Up' and 'Getting Started', through to 'Desktop Publishing', 'Graphics' and 'Using the PCW in a Small Business' are described in simple everyday English. Many experienced PCW users have contributed sections describing their areas of expertise.

Other topics include: Communicating with other PCW Users; Spreadsheets; Hobbies; Games; Educational Software; Add-Ons; Comms; Computer Programming Languages and An Introduction to Programming in Mallard Basic.

Many useful programs are supplied on the free disk: DWBAS (an extended Basic), a Database, Bank Cheque Reconciliation, Menu Program, Hangman, an Educational Alphabet Game, and an Animation Program.

This must be THE book every PCW user has been praying for!!

PCW: TARGET CP/M

(Book with free program disk) £17.95

A new book of 17 chapters of interest to everyone wanting to learn about CP/M Plus, as supplied with all PCWs, and those who already have an understanding of simple CP/M commands but want to learn more.

The first 8 chapters deal with CP/M commands, ideal for new PCW owners and those needing a reference source.

The remainder of the book, chapters 9 through 17 delve into 'high' and 'low' level languages, Assembler Programs, BDOS and BIOS calls, Banks and Interrupts, the organisation of CP/M and how to make your own CP/M programs as well as High Resolution, The Screen, and Geos.

In addition, the book provides a machine code course of tutor files and a 280 Assembler Program. If you want to 'Get into' CP/M - this must be the book for you.

CREDIT CARD ORDER LINE 021-585 7424

SPECIAL SOFTWARE FROM PCW WORLD

(available on 3" or 3.5" disk)

PCW: PEEK AND POKE £12.95

An advanced course of 15 chapters - on disk - complete with exercises, suitable for those interested in progressing beyond Basic into Assembler and Machine Code. Much of the material deals with the Mallard interpreter.

PCW: BASIC TUTORIAL £13.95

An introductory course (for the novice or moderately competent Basic Programmer) plus articles on specialised topics of programming, editing and Jetsam. Also an index of Basic words packed with example programs to illustrate their use.

PRINTMASTER XTRA £9.95

Software to enhance 'Printmaster' (Ref G/101 Budget DTP Program). This is an art processor that uses Printmaster pictures, icons, and graphic screens produced with Logo, Basic or Desktop Publishers. You can also design your own pictures for use with Printmaster and facilities to anotate, reflect and enlarge a picture.

GRAPHICS TRANSFER £12.95

A many featured suite of programs to convert graphic files to and from: Printmaster, MicroDesign, Stop Press, Newsdesk International, Desktop Publisher formats. Also a screen capture program to 'grab' CP/M screens which are saved to disk for use within DTP Programs mentioned above. "Graphics Transfer Plus" also available at £16.95 which includes a slide show facility.

SUPERSCRIPT 2 £29.95

Superscript allows colour printing (on colour printers) and access to built-in fonts supplied with many add-on printers, from within LocoScript 2. 250 key press commands allow you to access the features built into your add-on printer as well as the ability to include your own logo (a design program is included) or select from a small library provided.

SW101 Screen Dumps for non-Amstrad dot matrix add-on printers. Letter headers and page design from PRINTMASTER pictures for such printers (including colour facilities) £9.95

SW102 Disk Editor £9.95

SW103 Additional **MICRODESIGN 2** fonts from PRINTMASTER and PRINTIT £9.95

SW104 PRINTIT fonts converted for PRINTMASTER. Border design programs from standard PRINTMASTER fonts £9.95

SW105 BRITMAP create your own map of Britain from a database containing about 500 towns etc. Disk catalogue and management program £9.95

SW106 Mathematical disk. Many files from a simple adding machine through an introduction to Calculus to some Mandelbrot screens £9.95

SW107 Astronomy program developed from David Webber's program for the CPC 6128 ..... £9.95

SW108 Screen dumps for a daisywheel printer £9.95

SW109 BIG TYPE. Programs to enlarge the screen in CP/M or Basic for people with visual handicaps £9.95

SW110 AUTOWORD. Word processor type program that can be operated from fists, elbows, chins or feet! £9.95

SW111 FRACTALS & MANDLEBROT PLOTS £9.95

SW112 CHIP CRICKET. A game of skill £9.95

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Noticeboard

For Sale: Back issues of our newsletter. Not all back numbers are available. Those that are available cost £1 each. Telephone PCW-World on 021 585 7424

For Sale: Brother HR15 Daisywheel Printer - £100. Telephone Gerry at PCW-World.

PCW Challenge

Just in a compilation of games for 3 inch PCWs only. The disk contains 4 professionally written games to entertain you or your kin when the works all been done.

Formula 1 - A car racing game with day or night options.

Skywar - A helicopter war game for one or two players.

Strip Poker - Card playing game.

ACE - An exciting flight combat game. You are the only fighter pilot to defend our southern shores. Joystick compatible.

Special members price £8.95

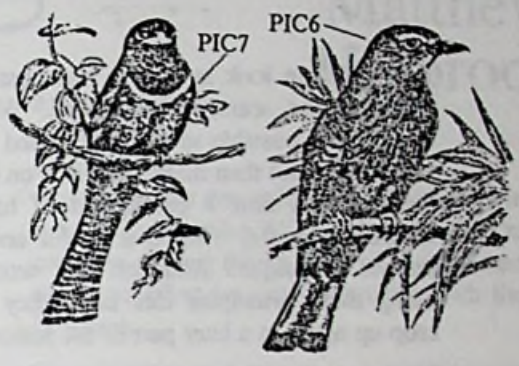
PCW *Streamlined* BASIC

Third edition £14.95

The third edition of our popular book *Streamlined* BASIC (with complimentary free disk) is ready now, at a reduced price of £14.95.

Not intended for the beginner (if you wish to learn programming in Mallard BASIC, start with our 'PCW: BASIC Tutorial' bookdisk at £9.95) Streamlined BASIC has much new information, not to be found elsewhere.

"PCW streamlined BASIC" book and disk is available only from the publishers, PCW-World, at £14.95 per copy (including free program disk).



New Graphics Library

Just in is a large selection of professionally drawn images for use with MicroDesign and Stop Press.

Most of the files are in .CUT format but there are a number of .MDAs as well. The .MDA files are unsuitable for use with Stop Press but using our Graphics Transfer program they can be converted to .CUTs.

The quality of these professionally drawn graphics is astounding and they are of a good size. Subjects are too numerous to tell you at the moment as we have just received the files and we are cataloguing the disks. We are sure that there will be something of interest to every Desktop Publisher!

We also hope to have available by the time you receive this newsletter a further selection of .MDA files of scenes, mainly Victorian. Again, by the same artist, but these will be full page when printed out. Ideal for printing and framing yourself, or if you prefer they could be painted first. There will be around 40 files in total which could be used for a wide variety of purposes.

If you are interested in these works of art, send a stamped addressed envelope with a note asking for the 'new graphics catalogue'. We hope to have this ready in the near future so that you will be able to select the disks you require by refering to the printed catalogue.

BASICally

Last time we look at how it was possible to improve our searching technique. We saw how it was possible to assign a sorted listing to an array and then make decisions on half of the list at a time - getting rid of half the records at stroke. This is a useful and well known technique. Although we won't be using these principles this time, they could crop up again in a later part of the series.

This month I want to move on to a topic that is very much close to my heart. This is something that I've been meaning to investigate for many years and have only just got around to doing! What can this subject be? Read on to find out.

What I've often needed to be able to do is to take a range of numbers and then list them in a random order. On the face of it, the task looks rather easy. You simply have a FOR statement looping around a random number generator that has the correct start and end values. However, if you think about the problem more closely you will see two very big problems. The first is that there is nothing to stop the same number being called more than once. Even more importantly, there is nothing to ensure that every number is used.

A way you might botch this would be to trap each number as it is generated and store it in an array. Each time the next random number is generated, a check would be made to see if it had been used already. If it had then another number would be generated. The array would need to be sorted to ensure a quick check for each number - may be using last time's technique.

This method of generating a sequence of numbers has many drawbacks. For instance, the longer it is allowed to run, the slower it will get because it will have more and more to check. Also, the random number generator will have to be called many, many times because the longer the process goes on, the number of acceptable numbers will reduce. I must admit this is the way I might have approached the task - until recently that is.

Let's just consider why you might want to produce sequences of numbers in this way. The most popular application would probably be games - perhaps the shuffling of a pack of cards (with each card carrying its own number between 1 and 52). The main application for me, though, is for a course on memory management that I am following. Here, each record that I am taught how to remember (e.g. various details about an author or composer) are given a unique number. For example, my record 1065 is Thomas Hardy. In fact my records for authors are held between 1000 and 1099. Therefore, I need to generate this sequence of 100 numbers in a random order so that I can test myself. In particular, I need to test that I am not learning a record in relation to another or to a point on the page. There is no better way of testing than this. So, we know what we want and we know why we want it. I've also hinted that it is possible - so let's find out how it's done!

As with previous examples, I will talk about the logic required for the program and then offer you the code. The first thing required is to establish and validate the range of numbers to be used. These will be assigned to variables START and FINISH and a random seed will be held in SEED. The number of figures to generate is found (NUMBER) with the calculation FINISH-START+1 (e.g. from 5 to ten is 6 figures).

With the number of figures established, an array called MEMORY is created. A count is then performed from 0 to the NUMBER less one. This will allow the array to be filled with numbers (e.g. MEMORY(0) will contain the first number (START), MEMORY(1) will contain the next number (START+1) and so on). This will give us a list of all the numbers we are dealing with.

A new array called NEWMEM will then be created. This will hold the randomly generated numbers. A count the same as the previous one is then performed. Inside this loop, the BASIC randomiser will be seeded with a value entered at the start of the

speaking...

Part 10

by Matthew Holbrook

program and some calculations will take place. These are detailed below.

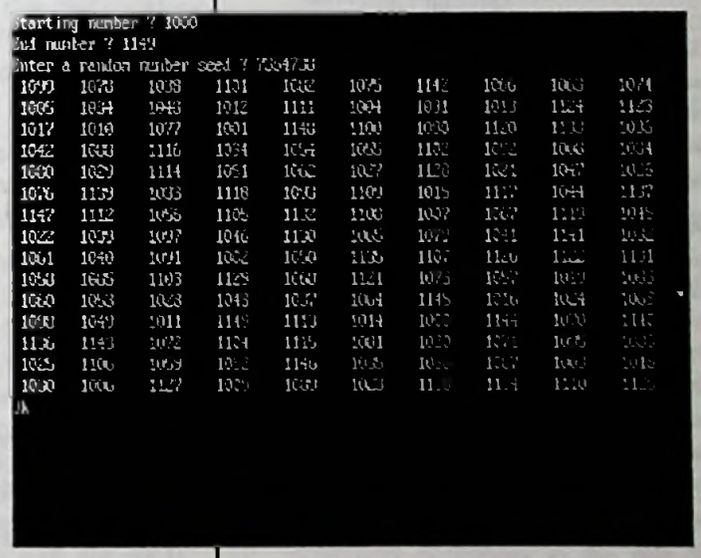
The first thing that happens is that a random number will be selected and assigned to the variable SELECTION. The selection criteria for the number will be that it must be between 0 and the total of the count so far. If there are ten numbers (say 1-10) then the range will be 0-10 the first time it is run and 0-9 the second time it is run. This will continue until all the numbers have been used. For each number that is selected it is put into the NEWMEM array at the position indicated by the counter (e.g. NEWMEM(0) for the first selection and NEWMEM(1) for the next).

The MEMORY array will then need to be reorganised so that the selected number is extracted. This is achieved by moving the sequence of numbers after the selected number down one. We can do this by having another counter, counting from the selected number to the total number of figures less one. If the numbers 1-10 were being used and 5 was the selected number, 6 would replace 5, 7 would replace 6 and so on. When this little loop has completed then the previous loop is allowed to continue - making a further selection and reorganising the array as above.

When this procedure has completed, you should end up with a filled array called NEWMEM. For ten numbers, you should end up with NEWMEM(0) through to NEWMEM(9). The contents of each part of the array may then be used for any purposes that you wish. For me I will take each part of the array in sequence and generate a question based on the number offered.

This technique should prove useful in many circumstances. It just goes to show that apparently impossible or quite difficult tasks can generally be accomplished in a language like BASIC. As long as you're prepared to give things a bit of thought and put some effort into experimenting with the language.

There's no set task this time. Instead, have a play with the code below and see what you can make of it. See you next time.




```
10 INPUT "Starting number ";START
20 INPUT "End number ";FINISH
25 INPUT "Enter a random number seed ";SEED
30 IF FINISH <= START THEN END
40 NUMBER = FINISH-START+1
50 DIM MEMORY(NUMBER)
60 FOR COUNT = 0 TO NUMBER-1
70 MEMORY(COUNT) = START + COUNT
80 NEXT
90 DIM NEWMEM(NUMBER)
```

BASICally speaking

```
100 FOR COUNT = 0 TO NUMBER-1

110 RANDOMIZE SEED

120 SELECTION = INT(RND(1)*(NUMBER-COUNT))

130 NEWMEM(COUNT) = MEMORY(SELECTION)

140 FOR NEWCOUNT = SELECTION TO NUMBER-1

150 MEMORY(NEWCOUNT) = MEMORY(NEW-
COUNT+1)

160 NEXT

170 NEXT

200 FOR I=0 TO NUMBER-1:PRINT TAB(10*I);NEW-
MEM(I);:NEXT
```

****Special Offer****

Several years ago, a game Matthew had written was being sold commercially. The game, entitled 'Rugged Racer' was a fairly simple, yet addictive car racing game, written in Mallard BASIC. Features included four levels of play and saved hi-scores and options.

As a special offer to PCW-World members, Matthew is prepared to sell the game for the bargain-basement price of £1.75. To qualify for this special offer, you must send Matthew a formatted 3" disk (Single or double density). Please state which density you are sending - to save Matthew's disc drive and sanity. You must also include a stamped addressed return envelope. Only orders accompanied by a PCW-World membership number qualify for this special offer. Non PCW-World members may purchase the game for £2.75.

The address to write to is:

Matthew Holbrook PCW-World Offer 2 Lansdown View Timsbury Bath Avon BA3 1JP

Please make all cheques payable to 'Matthew Holbrook' and allow up to three weeks for delivery.

Streamlined BASIC Productions

The products available are as follows:

Books:

(including disk):

Streamlined BASIC £14.95

The World of the PCW £14.95

PCW: Target CP/M £14.95

Book/disks:

PCW: BASIC Tutorial £9.95

PCW: Peek & Poke £11.95

Software:

Printmaster XTRA £6.95

Graphics Transfer £10.95

Graphics Transfer PLUS £12.95

SuperScript 1 £14.95

SuperScript 2 £24.95

When ordering kindly state which model PCW you are using and the disk size required. Please make cheques payable to PCW-World.

Always quote your membership number, whenever possible.

Q & A

by Geoffrey Childs

Q. I have two Basic programs, PROG1 and PROG2. If I load Basic I can run either program. But if I run PROG2, I cannot subsequently run PROG1 without reloading Basic, as I get a 'String space full' message. This is probably because PROG2 uses a machine code routine, but how do I correct it?

A. Some Basic programmers use a sensible practice of incorporating machine code routines into their programs. They know what the code does, but not the whys and hows. It can lead to difficulties like this, but luckily there are several ways to solve this problem, and I will suggest three possible solutions.

1. In PROG1 put an extra line MEMORY 62981 at the beginning. This is the standard location for all PCWs, versions of CP/M and Basic, but there are occasionally snags which will be mentioned later.

2. Do some editing of PROG2. You are almost sure to have a MEMORY command before you install the code. Precede this with an extra command h=HIMEM. At the end of the section which contains the installation of the code routine and subsequent CALLs to it, put in the command MEMORY h, and the original value of HIMEM will be restored. Make sure that the program will not use a CALL after this has happened, and protect the relevant section (at least) from a break by using OPTION RUN.

3. Relocate the code. In the particular case in point, the code was located at 61440 and short. It could have been located about 1400 bytes higher, saving this amount of memory, and probably obviating the error message. Sometimes, but not always, there may have to be alterations to the code if you relocate it.

For short pieces of code, it is usually possible to relocate code into areas which do not grab any extra memory at all. Bytes 63050-63109 can safely be used, as they only overwrite a CP/M copyright message that never appears. It is usually possible to use the top of the CP/M stack, though the location of this depends on the CP/M version. Another suitable place is the overwrite of the Basic welcome message, approximately bytes 290-400. You can also employ the area used for reading files, provided that you do not have an open file there while the code is being installed and called. (Opening the relevant file will immediately overwrite the code). You can find where this is available by:

```
OPEN''r'',1,''m:temp'':v=VARPTR(#1):CL
OSE 1
```

The variable v will give you the start of 128 bytes which will never be used apart from reading or writing in file-buffer 1 - unless you write your code into it. One warning, most graphics routines MUST be called from a location higher than 49151, so that some of these extra areas cannot be used by all code routines.

Going back to MEMORY 62981.... Normally when you have loaded Basic, this is where HIMEM will be, but there are occasional exceptions to the rule that you can safely restore this value of HIMEM.

Some programmers use extensions to CP/M called RSXs. An example of this is the program SAVE.COM on your CP/M disc. If you run SAVE.COM and then load Basic, you will notice that you have 2048 less free bytes than usual. HIMEM will also have been lowered by 2048. A more likely case of trouble is a PROFILE.SUB that uses an RSX. An RSX is formed if the PROFILE.SUB has lines that follow the line to load Basic (which is legitimate). This is why the first of these two alternatives for ending a PROFILE.SUB is preferable:

Your Questions Answered by our resident expert Geoffrey Childs

(a) BASIC MYPROG

(b) BASIC

<RUN"MYPROG"

Method (b) uses some of your precious Basic free bytes. You can test whether an RSX is present by PRINT PEEK(6)+256*PEEK(7)-1, which will give 62981 if no RSXs are present, but a different initial value of HIMEM if there is an RSX.

Another problem arises if a Basic extension such as DWBAS is used. DWBAS lowers HIMEM to 62463 (and uses the 0.5 K grabbed for its routines). Some Mallard Basic routines are also diverted into this area - for example, DWBAS diverts the end of program or break routine, so that the cursor is automatically restored. If you have installed DWBAS, but do not use it in your program and you restore HIMEM to 62981, the program will probably run until you come to the end, and then.... WHOOPS!

Q. I bought your program XXX.YYY. It doesn't work. Why not?

A. Probably because you haven't read the documentation (or have forgotten to switch the computer on).

Seriously, queries are not usually quite as bad as that, but very often an attempt to give a sensible answer is taking a shot in the dark. There will be programs (at PCW World or anywhere else) that were written before some new PCW development occurred. Programs that worked well on an 8256 and 8512 may not work on a 9512. With even newer machines, different versions of Basic and CP/M, different add-ons available, there is always a chance that something may not work with a particular system, although often a remedy is available.

The message here is that if you ask a query, give ALL the information that may be relevant. That gives us a much better chance of sorting things out without a lot of correspondence. PCW version, CP/M version, Basic version, Printer type, strange peripherals or memory add-ons are all useful information for some questions. A precise description of the type of error that occurs and when is useful. Sometimes a screen dump will reveal all. I can remember sorting out at least one problem from a screen dump that just happened to have the number of free bytes available in Basic - which wasn't what the questioner had tried to show by the dump!

While we are on this topic, it is becoming more and more important to state whether you have a 3 inch or 3.5 inch disc(s) when ordering. Life was simpler when there was just one model of PCW without any add-ons, but at least all the additions keep us on our toes!

Q. Is it possible to use the PCW to generate patterns for tapestries or rug making?

A. Yes, this is the intention of our new shareware disc SW113. A computer can store a picture in a set of numbers. For example, the pictures that Printmaster will transfer to the printer come from such a data set. As many readers will have seen, the same numbers can be used to reproduce these pictures on the computer screen. In the same way, such numbers can be used to generate a pattern for a tapestry in a form that a needleworker will be able to use.

SW113 does precisely this. The design is taken from one of two sources or both, and converted into a Locoscript file that forms the 'codes' for the needleworker. The bases for the design are Printmaster cuts and fractal plots. Fractals are designs made from a modern mathematical theory. These designs have parallels with patterns that occur in nature, such as the shape of coastlines, leaves or snowflakes. There is some symmetry, some order, yet at the same time a randomness of design. (We have another disc SW111 which goes into this in much greater detail). One well known example is the Mandelbrot set, but there are many (infinitely many) other possible fractals.

Printmaster pictures are in 'black and white'. Tapestries with only two colours would be dull. In the case of the Printmaster cuts, the user must edit in the colour scheme, although the programs provided on the disc are designed to make this as simple as possible. Fractal plots are in colour, although a screen fractal on a PCW can only do this in a limited way by depth of shading. Tapestry coloured plans, however, can be made from such data simply by the user specifying what colours he or she wants to include in the design.

I hope this new disc will provide something in this field, which, as far as I am aware, has not been previously attempted on the PCW.

Shareware is obtainable from PCW World. Discs are available at normal PD prices, but there is a further registration fee (usually £5, details in the documentation) due if the purchaser intends to use the disc after a trial. Members may also obtain the shareware direct from my home address on receipt of a blank formatted disc and SAE. There is no charge for this service, although the registration fee is still expected.

My home address, which can also be used by members who want to ask programming questions about the PCW (again please enclose SAE) is: G.T.Childs, 14 Gretton Road, WINCHCOMBE, Glos. GL54 5EG

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PCW Target

Daniel Evans takes a look at Geoffrey Childs' latest book and disc about CP/M on the PCW/PcWs.

The book is written for two audiences - those new to CP/M, and those who already understand simple CP/M commands, but want to go further. The book is divided into two main sections.

Ideal introduction for newcomers

The first 8 chapters describe the utilities supplied on the CP/M disc. These chapters will be very useful to owners of PcWs whose manuals have only very sparse technical information. Old PCW manuals generally contain most of the data, but they lack the clear explanations and examples that "PCW Target CP/M" supplies. These chapters therefore provide an ideal introduction to CP/M for newcomers, and a useful reference source for the more experienced. There is a minimum of jargon, and all terms are patiently explained.

The chapters are arranged as follows:

Chapter 1 is a brief and simple introduction to CP/M.

Chapter 2 gives a discussion of filenames together with brief explanations of how to use ERASE, DIR and TYPE.

Chapter 3 explains how to use DISCKIT and PIP.

Chapter 4 is a very comprehensive coverage of SUBMIT (for example to make self loading discs) and the use of LANGUAGE (to change the language of the characters used).

Chapter 5 explains ASCII, and details how to use SETKEYS. It also gives key numbers and common escape codes. The explanations here are particularly clear and easy to understand.

Chapter 6 describes and explains SET although the author questions whether it is of much use.

Chapters 7 and 8 discuss some of the lesser used files on the CP/M disc, which are quite interesting to investigate if you have a spare afternoon.

Neither too elementary nor too technical

The great value of these chapters is that they start off simple and gradually become more complex as your understanding grows. Geoffrey Childs guides you through, building up your knowledge and confidence to progress to more difficult areas. Newcomers in particular will welcome the simplicity. More experienced users may find some of the earlier chapters too trivial - but there is no reason why you shouldn't just "dip" into the book in the middle, avoiding the simpler chapters. This gripe apart, I believe that this first section achieves a good balance that will appeal to a variety of users. It is neither too elementary nor too technical.

The next 9 chapters are for braver souls, or for those with previous CP/M experience. New CP/M users will want to skip them until they have mastered the earlier instruction. The author suggests reading them "in a few months or even a few years" - depending on your skills and curiosity. But for those strong enough to move on and

'If I had this book 3 or 4 years ago I would have found it very helpful'

CP/M

Our new Book reviewed by Daniel Evans

experiment, these later chapters offer a lot of useful advice. They also provide reference material that many experienced CP/M users will appreciate.

This part of the book is really designed for use by people who are at the difficult transition between "occasionally using PEEKS/POKES" and starting to write in machine code. If I had had this book 3 or 4 years ago, I would have found it very helpful. If you are at this stage, then the book is worthwhile buying just for the second part. However, if you have "PCW *Streamlined* Basic" and understand it well, then you will probably already know much of the information. Nevertheless, the book might still be worth getting for reference. And the book can be easily used for reference because it comes with a comprehensive index.

The later chapters are arranged like this:

Chapter 9 is an introduction to less familiar terms in Basic - such as PEEK, POKE, MEMORY and their relation to CP/M. Some useful POKEs are then documented and explained. Most people will find these useful but they may be repetitive to those who have Geoff's "*Streamlined* Basic".

Chapter 10 gives a brief introduction to low level languages and assemblers.

Chapter 11 describes how to use the DWBASA extension supplied, and then explains how to use the Basic assembler, ASS. I have recently grown to like ASS, and would recommend it as a "first assembler".

Chapter 12 looks at memory, and briefly introduces BDOS and BIOS.

Chapter 13 gives a comprehensive coverage of BDOS.

Chapter 14 leads you through the writing of a machine code file scrambler, which could be useful even if the operation is not understood.

Chapter 15 discusses BIOS.

Chapter 16 describes the GEOS graphics system supplied on disc. This allows graphics commands to be called in a similar way to BDOS calls. A basic subroutine programme is provided for those who want to access the GEOS code direct from Basic.

Chapter 17. This final chapter, "Banks and interrupts", mentions banks briefly. It then discusses the writing of an automatic "screen blanking" routine which minimises screen "burn out".

Assembler Tutorial

In addition to the book the package provides a "machine code course" of "tutor files" together with a Z80 assembler which runs from Basic. The tutor files, which are stored on disc, will provide a good starting point for people who want to programme in machine code. The assembler is a valuable tool for beginners and more experienced programmers alike. But the system does, of course, have the disadvantage that you can't read the tutor files on screen and program at the same time. So there may be people who would prefer to buy a (printed) book specifically on PCW machine code.

The other side of the disc includes extra CP/M programs, which you may find useful additions to those provided on the CP/M disc supplied with the PCW.

Overall, I consider the book a good buy, and well worth the money, priced at £17.95 (special members' price, £14.95). It is useful for people who are new to CP/M, to PcW owners with non-technical manuals, and to people who are starting machine code. I recommend it.

Availability

'PCW Target CP/M' is available now at the special price of £14.95. The disc of sample programs and tutorial files is free when you purchase the book, but please state the disc size required (3" or 3.5") when ordering.

Customising

Part 5 PROFILE.SUB

Making a special .SUB file

Although this series is about .COM files I thought we would have a change and make a PROFILE.SUB with a difference. This is the .SUB file which holds all the information for Submit.com and Pip.com utilities, they submit and copy the information to the M: drive. With the PCW8256 and the new PCW/ PcW+/9000 series computers only having one drive [drive A:], while the 8512 model has two drives, I had to work out a way in which I could include both 8256 and 9000/+ machines, and here's how I have done it.

Most of you will have your start-up CP/M disc already configured to suit your needs, the .SUB file we are going to create will save you valuable time, which some of you may take up typing in commands to access BASIC and drives and groups. This .SUB file takes all the hard work out of booting-up, it copies your .COM files to drive M: plus the drives menu program (which we are going to type in later). The filenames do not get printed on the screen when booting up, so the boredom of having to watch them scroll down the screen has gone. In fact you can be doing other things while copying is taking place. When this operation is completed, you are greeted with a pretty caption which informs you that the .COM files have been copied to drive M: and invites you to press [RETURN] to LOAD and RUN BASIC and the drives menu. All this takes about 2mins, you are then presented with the drive and group selector which will give a directory of BASIC and Locoscript files in groups (0-7) and Locoscript Limbo Files (8-15). With the drives menu program sitting in drive M: it can be brought into action when required by typing:

RUN "M:DRIVES.BAS

Owners of 8000 PCW's with having two sides to their A: drive discs, will be required to arrange what .COM files they need on the 'A' side of their start-up disc then add the 'Drives.bas' program to this. Owners of 9000 PCW/PcW's can arrange all their .COM files plus the 'Drives.bas' program all on the same disc.

So Members, if you are ready we will start, with CP/M LOADed and RUNing, and your CP/M start up disc still in the A: drive at the A> prompt type:

DISCKIT

then when the program LOADs and RUNs, format a blank disc in the A: drive and mark it 'COPY DISC', then [EXIT] back to the A> prompt and type:

BASIC RPED (Make sure that RPED.BAS is on your disc)

When the main menu appears press [F3], When the next screen appears with the prompt for the filename, for the desination disc, type:- PROFILE, then press the full-stop key (.) then type SUB and press [RETURN], the screen will clear and after a few seconds you are presented with the editing screen.

The PRO-FILE.SUB program

TYPE-IN the following lines as it is below (between the dotted lines) but don't include the dotted lines. There are 20 spaces between the ; and the lefthand *'s, and there are 47 *'s in the horizontal lines.

```
SETDEF M:,* [ORDER=(COM,SUB)
TEMPORARY = M:]

pip

<m:=a:*.com[K]

<m:=a:rped.bas

<m:=a:drives.bas

<

: **********************************
```

.COM files

by Harvey Clayworth

; * FILES HAVE BEEN COPIED TO M: *
; ***********************************
; * PRESS [ETURN] TO LOAD BASIC& DRIVES MENU *
; ***********************************

<m:

pip

<

basic drives

When you have entered all the above, press [EXIT] to SAVE the file, when the menu re-appears press [EXIT] again to Quit RPED. Your new PROFILE.SUB file should now be onyour'COPY DISC', so you can copy it to your start-of-day EMS/EMT disc. But don't forget to give your present PROFILE.SUB file a new filetype first, eg. PROFILE.FIL. This ensures that your new .SUB file will be submited.

```
10 REM - DRIVE SELECTION PROGRAM

20 e$=CHR$(27):cls$=e$+"E"+e$+"H":on$=e$+"e":off$=e$+"f"

30 DEF FNdg$(x,y)=e$+"Y"+CHR$(32+x)+CHR$(32+y)

40 rev$=e$+CHR$(112):norm$=e$+CHR$(113)

50 PRINT cls$;off$

60 PRINT FNdg$(3,24);rev$;" * S E L E C T: D R I V E and G R O U P * ";norm$

80 PRINT FNdg$(8,26);"A..... DRIVE A:"

90 PRINT FNdg$(10,26);"B..... DRIVE B:"

100 PRINT FNdg$(12,26);"M..... DRIVE M:"

110 PRINT FNdg$(14,26);"S..... SYSTEM (CP/M)"

120 PRINT FNdg$(17,22);"Please Put Your Data Disc In The Appropriate Drive "

130 PRINT FNdg$(19,22);"Then Select The Drive, by Typing:- A or B or M "

140 PRINT FNdg$(21,22);"Or return to the SYSTEM, by Typing:- S"

150 dr$=UPPER$(INPUT$(1)):i=INSTR("ABMS",dr$):ON i GOTO 160,160,160,240:GOTO 150

160 OPTION FILES dr$:GOTO 170

170 PRINT cls$;FNdg$(12,25);rev$;" * S E L E C T: G R O U P * ";norm$

180 PRINT FNdg$(14,25);"Normal Groups (0-7)":PRINT FNdg$(16,25);"Limbo Groups (8-15)"

190 g$=UPPER$(g$):PRINT FNdg$(20,25);:INPUT"ENTER GROUP/USER (then press [RETURN]) ",g$:GOTO 200

200 IF g$="" THEN 170:g=VAL(g$):IF g<0 OR g>15 THEN GOTO 170 ELSE OPTION FILES g$:GOTO 210

210 PRINT cls$;FNdg$(1,28);"DRIVE [";dr$+":] GROUP [";g$;"]":PRINT FNdg$(3,25);"DIRECTORY OF [";dr$+":] DRIVE FILES":PRINT:PRINT:GOTO 220

220 GOSUB 270

230 PRINT FNdg$(25,0);"(D)rive/Group Re-select":PRINT FNdg$(26,0);"(G)roup Only Re-select ":PRINT F N d g $ ( 2 7 , 0 ) ; " ( E ) x i t P r o - gram":sel$=UPPER$(INPUT$(1)):i=INSTR("DGE",sel$):ON i GOTO 50,260,250:GOTO 230

240 PRINT on$: SYSTEM

250 PRINT cls$;FNdg$(28,28);" ***** F I N I S H E D ***** ":PRINT on$:END

260 PRINT cls$:GOTO 160

270 x=1

280 file$="dummy"

290 WHILE file$<>""

300 file$=FIND$("*.*",x)

310 IF file$<>"" THEN PRINT file$+" : ";

320 x=x+1

330 WEND

340 PRINT:x=x-2:PRINT:PRINT "Number of files in this Group: [";x;"]"

350 RETURN
```

EDITOR'S NOTE

Experienced users may grumble that what is achieved could be done with DIR (or DIR.COM) almost as easily. However even such users may find one or two useful tricks in the construction of the PROFILE.SUB. Less experienced users may find Harvey's approach more user friendly and a study of the BASIC program is of interest.

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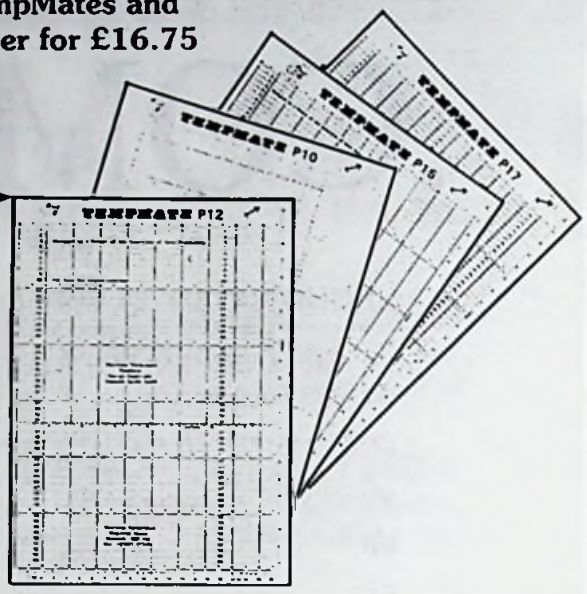

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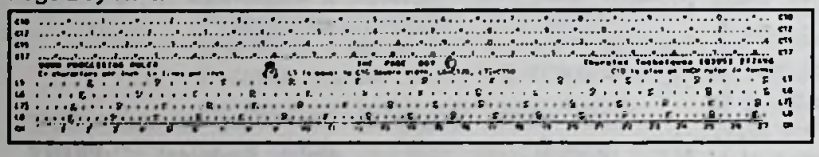

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PCW WORLD

MEADWAY COURT, BLOOMFIELD STREET NORTH
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AMSTRAD PCW Software

ACCOUNTS

Money Manager (Connect) £59.95
Popular Accounts Plus (Sagesoft) £145.00
Popular Invoicing (Sagesoft) £69.95
Popular Payroll (Sagesoft) £69.95
Total Accounting (DRP Software) £84.95

COMMUNICATIONS

Popular Chit Chat (Sagesoft) £99.95
Mini Office Professional (Database) £25.95
AMSTRAD SM2400 Modem, ProLink & Software £199

DATABASE

Masterfile 8000 (Campbell) £44.95
LocoFile 8/9 (Locomotive) £32.95
LocoFile & LocoMail (Locomotive) £40.50
Mini Office Professional (Database) £25.95
LocoScript 3 & LocoFile (Locomotive) £54.00

DeskTop Publishing

MicroDesign2 (Creative Technology) £29.00
MicroDesign3 (Creative Technology) £75.00
Fonts Library (disks 2 & 3) Creative Tech. £26.50
Desktop Publisher (Database Software) £19.95
Graphics Transfer (PCW-World) £12.95

INTREGATED

Mini Office Professional (Database) £25.95
LocoScript 3 & LocoFile (Locomotive) £54.00
PCW Works (SCA) £49.95

SPREADSHEETS

Supercalc 2 ..... £44.00
Cracker II Turbo + (Paperback) £31.95
Mini Office Professional (Database) £25.95
Rocket (Software Imperative) £43.00

UTILITY

Flipper 3 (Software Imperative) £33.00
LocoLink (Locomotive) £29.95
2 IN 1 (Moonstone) £29.95
PCW Toolkit (Moonstone) £29.95
MFU 8256/8512 ONLY (Moonstone) £49.95
MSDisc (PCW-World) PCW <-> PC £4.95
Touch 'n Go Typing Tutor (Paperback) £21.69
Graphics Transfer (PCW-World) £12.95
Graphics Transfer Plus (PCW-World) £16.95
LocoFont 24 (Locomotive) for 24 pin printers £29.00
LocoFont BJ (Locomotive) £29.00

TUTORIAL

Touch & Go (Paperback) typing tutor £21.69
Mallard BASIC Tutorial (PCW-World) £13.95
PCW Peek & Poke (PCW-World) £12.95

BOOKS

Streamlined BASIC (PCW-World) £17.95
Mallard BASIC Intro. & Ref. (Locomotive) £14.95
The World of the PCW (PCW-World) £17.95
PCW Target CP/M (PCW-World) £17.95

WORD PROCESSING

Protext (Arnor) £49.95
Prospell (Arnor) £29.95
LocoFont set 1 & 2 (Locomotive) £29.00
LocoMail (Locomotive) £29.00
LocoScript 3 (Loco) upgrade from LocoScript 1 £39.00
LocoScript 3 (Loco) upgrade from LocoScript 2 £29.00
LocoScript 3 & Spell (Locomotive) £49.00
LocoSpell (Locomotive) £24.95
Printer Support Pack (Locomotive) £24.50
LocoScript 3 & LocoFile (Locomotive) £54.00
New Word II (Paperback) £49.95
SuperScript (PCW-World) £29.95
LocoMail (Amsoft) £14.95
XWorder (Thurston) £15.95
WordDisc Thesaurus (Thurston) needs LocoFile £16.95
TempDisc 1 (Thurston) for LocoScript 1 ..... £17.95
TempDisc 2 (Thurston) PCW8000s & Loco 2 ... £18.95
TempDisc 8.2 (Thurston) PCW8512 LocoMail £19.95
TempDisc 9 (Thurston) PCW9512 ..... £19.95
PageBoy Wordprocessing ruler £4.95
TempMates (Thurston) ..... each £5.95

EDUCATIONAL

Better Maths / Better Spelling ..... each £17.95
Fun School III <5; 5-7; > 7 yrs ..... each £24.95
Fun School 1V £24.99
Junior Playtime £17.95
Magic Maths £17.95
Maths Mania 8-12 yrs £17.95

GAMES

Tomahawk 8 & 9 ..... £19.95
Bridge Player 2150 ..... £29.95
Clock Chess 8 & 9 ..... £19.95
TT Patience (Thurston) £14.95

Cut Price Software

For the largest range of Public Domain and Shareware in the U.K. see pages 1 to 3 of this catalogue.

Special Offers

Disk Drives

Add an industry standard disk drive to your PCW8256/8512, PCW9512 or PcW9256 PcW9512+. This will enable you to make use of the less expensive 3.5" disks. The 3.5" drive formats to 706K giving a new lease of life to the PCW8256.

All drives are supplied with U/116 software and 10 X 3.5" disks, free of charge. U/116 has software to format and read PCW and PC (MS DOS) format disks. Using MSDISC (on U/116) any PC 720K format disk may be read, formatted, copied or written to.

Full fitting instructions are supplied with each unit, no soldering involved, simply remove the rear of the case and plug into the sockets already provided. Internal drives require the removal of the fascia panel and enlarged slightly to accommodate the slightly larger 3.5" drive mechanism. The new drive is mounted on pillars inside the PCW. Screws, templates and step by step instructions are provided.

External 3.5" Disk Drive

A second drive for the PCW8256 or PCW9512. Easy to fit - £59. **NEW LOWER PRICE!**

External 5.25" Disk Drive (Lower Price)

A second drive for the PCW8256 or PCW9512. Easy to fit - £55.

External 3.5" Disk Drive "Sharer"

A third drive for the PCW8512 or PCW9512 (with two drives already fitted). Auto detecting mechanism, no switches. £85

External 3.5" Disk Drive PcW

A second drive for the new PcWs - £72

External 3.5" Disk Drive ABBA

A new model for use as an "A" or "B" drive for fitting to the PCW8256 or PCW9512. Supplied with free CP/M upgrade. This model has switches to allow you to use the drive as an A or B drive. £95

Internal 3.5" A Drive

For the PCW9512 - £85

Internal 3.5" B Drive (Lower Price)

For the PCW8256 - £69

3" Disk Drive "A" A brand new replacement 3" A drive for the PCW8256/8512 - While stocks last - £95.

Other Products

3" Clear Rigid Plastic cases - 10 off £4.00

Cases, as above. Seconds - 10 off £2.00

3.5" Clear rigid Cases - 10 off £4.95

40 Capacity Disk box for 3.5" disks - £4.95

28 Capacity Disk box for 3" disks - £4.95

80 Capacity Disk box for 3.5" disks - £8.95

45 Capacity Disk box for 3" disks - £8.95

120 Capacity Disk box for 3.5" disks - £9.95

70 Capacity Disk box for 3" disks - £9.95

Amstrad 10 X 3" Capacity Fanfile box - £4

3 Piece Dustcover, state model - £7.95

Printer Ribbons

PCW8256/8512 and PcW9256

Black Fabric or Black Multistrike film - any mixture of 10 ribbons - £25 per 10.

Coloured Fabric ribbons. Choose from Red, Blue, Green, Yellow, Brown and Purple. £4 each or £35 per 10 ribbons. Colours may be mixed to get the discounted 10 rate.

PCW9512 and PcW9512+ Daisywheel

Black Fabric or Black Multistrike film - any mixture of 10 ribbons - £25 per 10.

Coloured Fabric ribbons. Choose from Red, Blue, Green, Yellow, Brown and Purple. £4 each or £35 per 10 ribbons. Colours may be mixed to get the discounted 10 rate.

Star LC10 & Compatible

Black Fabric ribbons - £2.99 each or £25 per 10 ribbons. A few single colours available at £4 per ribbon.

Star LC24 10 & Compatible

Black Fabric ribbons - £2.99 each or £25 per 10 ribbons.

Citizen 120 D, 120 D+, 224, Swift etc

Black fabric ribbons - £2.99 each or £25 per 10 ribbons.